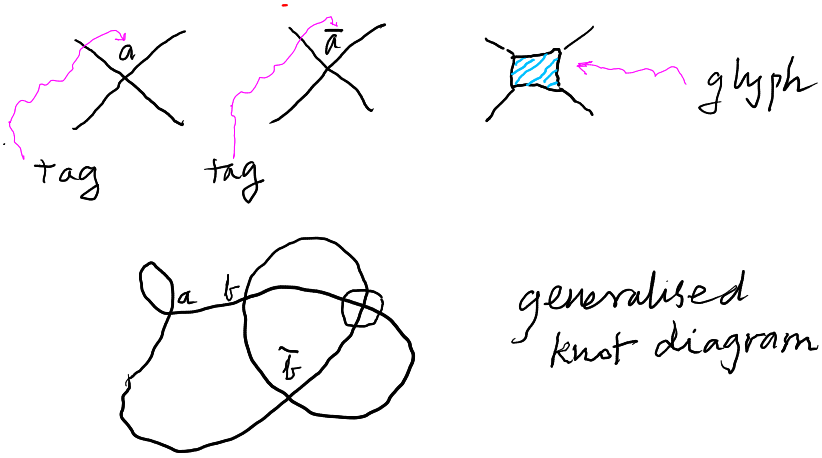
Generalised Knots
+ properties of Braiding etc

Roger Fenn (Sussex)

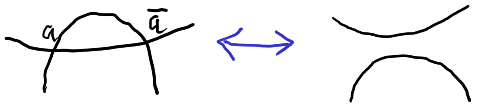
Joint work with Andy Bartholomew

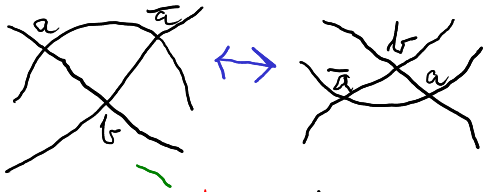


generalised knot diagram

Reidemeister Moves

R_1: 

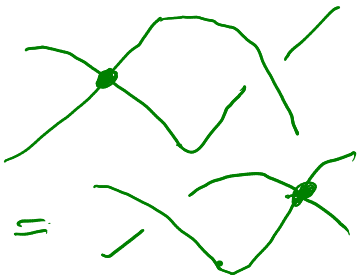
R_2: 

R_3: 

} generalised knot theory

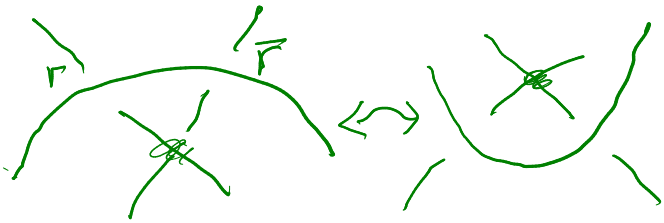
a dominates b

R_4 



A knot theory is **REGULAR**
if R_2 always

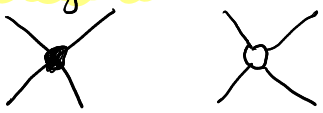
A regular knot theory is **NORMAL**
if it has a DOMINATOR
Classical knot theory is normal



EXAMPLES

All virtual Knot theories are normal

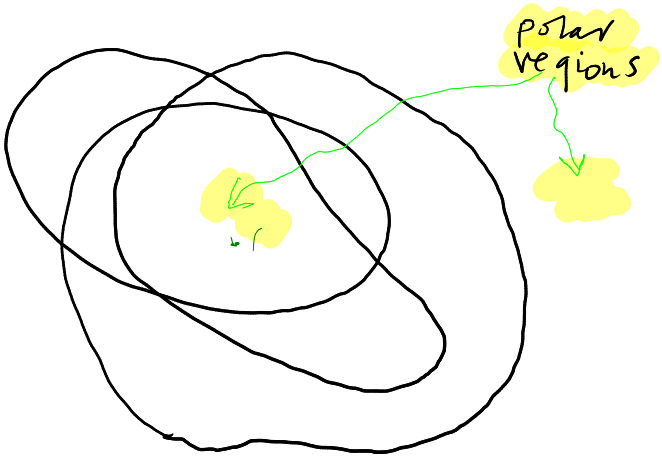
Singular knot theory is normal



Planar doodles are regular but not normal

DIAGRAMS are not regular

Braided Diagrams



$\subset S^2$

Generalised Alexander (F+B)

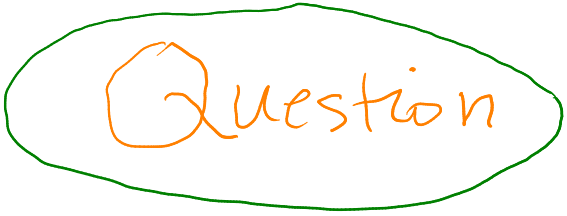
Every knot in a regular theory can be represented by a braided diagram

Generalised Markov (F+B)

Any two braided diagrams in a normal theory which represent the same knot can be joined by a sequence of R-moves which preserve their braiding

Generalised Braids

Monoid



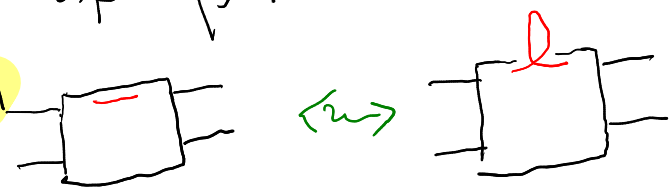
Does every braid monoid embed in its Groupification?

Markov Moves

+

conjugation $\widehat{\alpha\beta} = \widehat{\beta\alpha}$

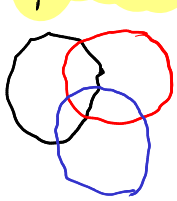
stabilisation

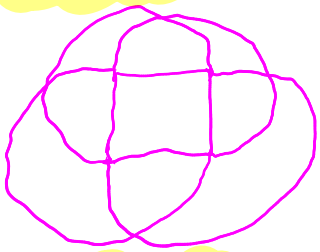


Exchange

exchange not needed for classical, welds, ...
needed for virtual

Planar doodles (no R_3)





Closure of twins

$(t_1 t_2)^3$

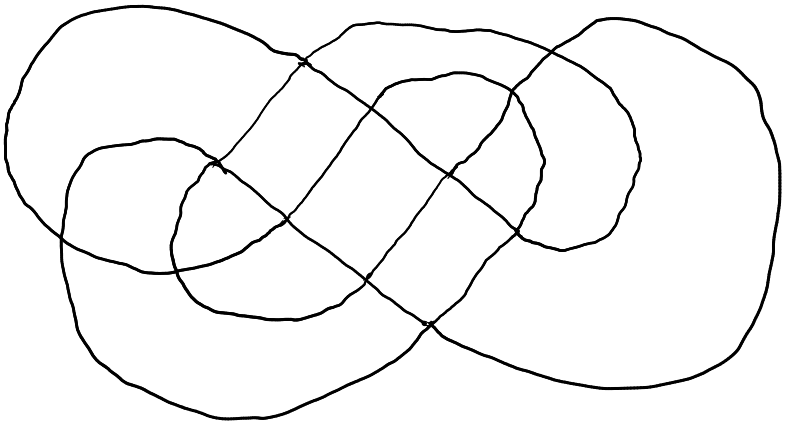
$t_1 \dots t_{n-1}$

$t_i^2 = 1 \quad A_i t_j \; |i-j|>1$

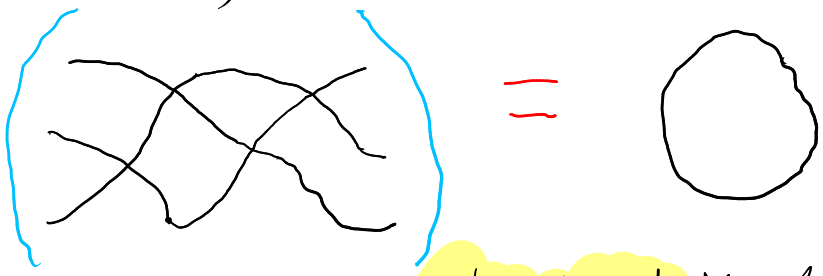
$= t_j t_i$

Minimal Doodle not closed

no monogons
or bigons



$(t_1 t_2)^2$

Closure 

cannot be reduced by standard Markov Moves

needs an extra